

REMARKS

Reconsideration and allowance in view of the foregoing amendments and the following remarks are respectfully requested.

As set forth above, **Claims 8, 11 – 14, 16 – 19, and 21 – 23** remain pending for examination.

Rejections under 35 U.S.C. §103(a)

The following rejections under 35 U.S.C. §103(a) were issued in the outstanding Final Office Action:

- (a) **Claims 8 and 11 – 13** were rejected over Awater, *et al.*, (U.S. Patent 6,175,551; hereafter "Awater") in view of Schenk (U.S. Patent 6,529,925; hereafter "Schenk") and Taunton, *et al.*, (U.S. Pat. Pub.2003/0026263; hereafter "Taunton");
- (b) **Claim 14** was rejected over Awater in view of Schenk, Taunton and further in view of Henkel, *et al.*, (U.S. Publication "PAR Reduction Revisted: An Extension of Tellado's Method;" hereafter "Henkel");
- (c) **Claims 16 - 19** were rejected over Awater in view of Schenk and Taunton; and
- (d) **Claim 23** was rejected over Awater in view of Schenk, Taunton, and further in view of Henkel.

The Applicants appreciatively note the concession that the Applicants' arguments submitted on September 11, 2010, in response to the previous Office Action of May 12, 2010, were persuasive, as set forth in the "Response to Arguments" on page 2 of the outstanding Office Action. However, with regard to rejection (a) in particular, which



serves as the foundation for rejections (b) - (d), it appears that the rejections of May 12, 2010 have been repeated, practically verbatim, up until the citations of Taunton replace those of Henkel. Accordingly, the arguments presented below, particularly with regard to Awater in view of Schenk, may repeat arguments presented on September 11, 2010, with new substantive arguments being directed to Taunton in combination therewith.

Regardless, the Applicants respectfully traverse all of rejections (a) - (d) and further request that both rejections be reconsidered and withdrawn.

Independent **Claim 8** recites, with emphasis added:

A method for reducing the crest factor of a data symbol to be transmitted in a multi-carrier data transmission system, the data symbol being a function of a plurality of signals provided within a predetermined data frame, each of the plurality of signals allocated to a carrier, each carrier occupying at least one frequency from a transmit data spectrum, **at least one carrier being reserved which is not provided for the data transmission**, the method comprising:

receiving the predetermined data frame, the predetermined data frame exhibiting the data symbol and a cyclic prefix which is derived from a part of the data symbol; and

performing crest factor reduction corresponding to the predetermined data frame based at least in part on peak values within the cyclic prefix of the predetermined data frame, by:

(a) **filtering the data symbol and the cyclic prefix;**

(b) **determining whether a time-domain function of the data symbol and of the cyclic prefix within the predetermined data frame exhibits at least one peak value that exceeds a first threshold;**

(c) **determining an amplitude of an exhibited peak value and an associated position within the predetermined data frame;**

(d) **generating a correction function by scaling and transposing a sample correction function in dependence on the amplitude and associated position of the exhibited peak value;**

(e) **using the at least one carrier which is not available for data transmission for generating the sample correction function in the time domain; and**

(f) **modifying the data symbol to be
transmitted by superimposing the correction function.**

The portions highlighted in the above listing of Claim 8 are those features acknowledged in the outstanding rejection as not being disclosed by Awater.

While the Applicants do not presently disagree with the assertion made in the rejection that Schenk discloses "where at least one carrier being reserved which is not provided for the data transmission ([Schenk] Col. 1, lines 438 – 60)," the Applicants do not agree that Taunton is able to compensate for, at least, the acknowledged deficiencies of Awater regarding the remaining highlighted portions of independent **Claim 8** that are recited *within* the recitation of "performing crest factor reduction..."

First off, regard to the recitation of:

performing crest factor reduction corresponding to
the predetermined data frame based at least in part on
peak values within the cyclic prefix of the predetermined
data frame, by:

(a) **filtering the data symbol and the
cyclic prefix...**

the rejection points to [0041] and [0045] of Taunton as a favorable comparison. The Applicants respectfully disagree.

The description at [0041] of Taunton includes (with emphasis added by the Applicants):

[0041] ...One way to determine accurately whether a given symbol will contain a peak above the threshold level would be to simply measure the peak after the preprocessing normally carried out in the AFE has been performed. Up-sampling and any signal filtering required might occur immediately after the IFFT and cyclic prefix insertion, before the peak of the symbol is measured...

[0045] In this way, symbol regeneration to reduce the crest factor can be performed even in the presence of signal filtering or oversampling functions or other signal processing elements in the analogue front end that affect the transmission of symbols from the IFFT module to the line driver.

From [0041] and [0045], the Applicants acknowledge the mention of “Up-sampling, and any signal filtering,” but note that there is no mention that the filtering for the up-sampling is of the data symbol and the cyclic prefix, as recited in independent **Claim 8**. More significantly, though, the discussion that runs from [0041] to [0045] actually speaks to the negative implications of such up-sampling and its accompanying signal filtering, resulting in an increase in power and more complex system design, see [0043]. Thus, the reference appears to teach away from that which it is currently purported as teaching and/or suggesting.

More particularly, from [0045], the Applicants acknowledge the mention of symbol regeneration to reduce the crest factor, but note that the regeneration appears to be performed *even in the presence of signal filtering*, which implies that the regeneration is performed *in spite* of the signal filtering. It is noted that there is no mention that such filtering is of the data symbol and the cyclic prefix, as recited in independent **Claim 8**. Regardless, the Applicants submit that the reference actually discourages “signal filtering,” whether or not it is of the data symbol and the cyclic prefix.

With regard to the recitation of:

performing crest factor reduction corresponding to the predetermined data frame based at least in part on peak values within the cyclic prefix of the predetermined data frame, by:

...
(b) determining whether a time-domain function of the data symbol and of the cyclic prefix within the predetermined data frame exhibits at least one peak value that exceeds a first threshold ...

the rejection points to [0038], [0040], and [0041] of Taunton as a favorable comparison. Again, the Applicants respectfully disagree.

The cited disclosure references “modeling the peak amplitude that the symbol will have after the subsequent processing in the analogue front end and comparing the modeled peak amplitude with a threshold...” [0038], “re-processing to create a new and different time-domain version of the symbol...” [0040], and “Up-sampling, and any signal filtering required, might occur immediate after the IFFT and cyclic prefix insertion...” [0041], but there is no teaching that can persuasively align these disclosures to even suggest that together they suggest determining whether a time-domain function the data symbol and of the cyclic prefix within a predetermined data frame exhibits at least one peak value that exceeds a first threshold. The cited passages mention “threshold,” “time-domain,” and “cyclic prefix,” but does not disclose them in a cogent manner that comprehensively teaches or suggests the presently claimed features.

The above passages are cited to demonstrate that the rejection appears to cull, piecemeal, terms from Taunton that match favorably with currently recited terms. However, while the Applicants are not arguing that Taunton is not relevant to the rejected claims, the culled terms that serve as the basis for the cited passages from Taunton are not contextually applicable to the corresponding recitation in **Claim 8**.

More significantly, with regard to the partial recitation of:

performing crest factor reduction corresponding to
the predetermined data frame based at least in part on
peak values within the cyclic prefix of the predetermined
data frame, by:

...
...
...

(d) **generating a correction function by
scaling and transposing a sample correction function
in dependence on the amplitude and associated
position of the exhibited peak value...**

the rejection points to [0040], [0064] - [0067], and [0026] of Taunton. However, the Background described at [0026] and [0040] fails to disclose any correction function,

much less one generated by scaling and transposing a sample correction function, as presently recited.

At [0064] - [0067], Taunton discloses replacing an original symbol with a regenerated symbol if the original symbol exceeds a peak threshold, but there is no argument presented that such replacement may be considered to be "generating a correction function," and there is no disclosure that such replacement is based upon scaling and transposing a sample correction function based on the amplitude and associated position of the peak threshold.

With regard to the partial recitation of:

performing crest factor reduction corresponding to the predetermined data frame based at least in part on peak values within the cyclic prefix of the predetermined data frame, by:

...
...
...
...

(e) using the at least one carrier which is not available for data transmission for generating the sample correction function in the time domain...

the rejection points to [0067] of Taunton. However, there simply is no disclosure of using a carrier that is not available for data transmission, much less for generating a sample correction function in the time domain.

Lastly, the rejection simply does not address the partial recitation of:

performing crest factor reduction corresponding to the predetermined data frame based at least in part on peak values within the cyclic prefix of the predetermined data frame, by:

...
...
...
...
...

(f) modifying the data symbol to be transmitted by superimposing the correction function.

Regardless, the Applicants submit that such modifying is not taught or suggested by Taunton, Awater or Schenk.

Therefore, for at least the reasons set forth above, it is respectfully submitted that independent **Claim 8**, as well as corresponding dependent **Claims 11 – 13**, are patentable over the proposed combination of references, and so the current rejection (a) under 35 U.S.C. §103(a) should be reconsidered and withdrawn.

Claim 14 depends from **Claim 8**, and the Applicants submit that the “Dirac-like time domain signal p” described by Henkel is insufficient to compensate for the deficiencies of Awater, Schenk, and Taunton as set forth above regarding rejection (a). Therefore, it is respectfully requested that rejection (b) also be reconsidered and withdrawn.

Just as the proposed combination of **Awater, Schenk, and Taunton** fails to teach or suggested the acts of “(c) determining...” and “(d) generating...,” as recited in **Claim 8**, it is respectfully submitted that the proposed combination of **Awater, Schenk, and Taunton** also fails to teach or suggest at least the below emphasized recitation, which includes similar acts as those discussed in connection with **Claim 8** hereinabove, of **Claim 16**.

Independent **Claim 16** recites, with emphasis added:

A method for reducing the crest factor of a data symbol to be transmitted in a multi-carrier data transmission system, the data symbol being a function of a plurality of signals provided within a predetermined data frame, each of the plurality of signals allocated to a carrier, each carrier occupying at least one frequency from a transmit data spectrum, the method comprising:

(a) receiving the predetermined data frame, the predetermined data frame having the data symbol and a prefix which is derived from a part of the data symbol;

(b) performing crest factor reduction corresponding to the predetermined data frame by determining an amplitude of an identified peak value and an associated position within the predetermined data frame; and

(c) generating a correction function by scaling and transposing a sample correction function in dependence on the amplitude and associated position of the identified peak value and using at least one carrier which is not available for data transmission for generating the sample correction function in the time domain.

The portions highlighted in the above listing of **Claim 16** are those features acknowledged in the outstanding rejection as not being disclosed by Awater.

For instance, regarding the recited "generating," the rejection points to [0040], [0064] - [0067], and [0026] of Taunton. However, the Background described at [0026] and [0040] fails to disclose any correction function, much less one generated by scaling and transposing a sample correction function, as presently recited.

At [0064] - [0067], Taunton discloses replacing an original symbol with a regenerated symbol if the original symbol exceeds a peak threshold, but there is no argument presented that such replacement may be considered to be "generating a correction function," and there is no disclosure that such replacement is based upon scaling and transposing a sample correction function based on the amplitude and associated position of the peak threshold.

Again, the matching of terms from the reference to the rejected claims, while not irrelevant, is lacking proper context. Therefore, for at least the reasons set forth above, it is respectfully submitted that independent **Claim 16**, as well as corresponding dependent **Claims 17 - 19, 21, and 22**, are patentable over the proposed combination of references, and so the current rejection (a) under 35 U.S.C. §103(a) should be reconsidered and withdrawn.

Claim 23 depends from **Claim 16**, and the Applicants submit that the "Dirac-like time domain signal p" described by Henkel is insufficient to compensate for the deficiencies of Awater, Schenk, and Taunton as set forth above regarding rejection (c). Therefore, it is respectfully requested that rejection (d) also be reconsidered and withdrawn.

Conclusion

The remaining references of record have been studied. It is respectfully submitted that they do not compensate for the deficiencies of the references utilized in rejecting the currently pending claims.

All objections and rejections having been addressed, the Applicants submit that the present application is in condition for allowance, and therefore early and forthright issuance of a Notice to that effect is earnestly solicited.

Respectfully Submitted,

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